

WHAT IS CLAIMED IS:

1. A system for generating and displaying engine performance data for an operating aircraft, comprising:

a data acquisition module that acquires sensor data from a sensor that monitors an engine performance related parameter;

an engine performance monitoring module, coupled to the data acquisition module, that compares sensor data acquired by the data acquisition module to engine diagnostic data and computes engine power available data and engine health data; and

a display located in the aircraft, coupled to the engine performance module, that displays engine power available data and engine health data computed by the engine performance monitoring module.

2. The system of claim 1, further comprising:

a target value computation module, coupled between the engine performance monitoring module and the display, that calculates at least one target value using data received from the engine performance monitoring module.

3. The system of claim 2, wherein the at least one target value is a thrust.

4. The system of claim 2, wherein the at least one target value is a torque.

5. The system of claim 2, wherein the at least one target value is a value required for maximum range of the aircraft.

6. The system of claim 2, wherein the at least one target value is a value required for maximum endurance of the aircraft.

7. The system of claim 2, wherein the at least one target value is a value for best rate of climb of the aircraft.

8. The system of claim 2, wherein the at least one target value is a value required to hover the aircraft in ground effect.

9. The system of claim 2, wherein the at least one target value is a value required to hover the aircraft out of ground effect.

10. The system of claim 2, wherein the at least one target value is a displayed graphically on the display.

11. The system of claim 1, wherein the engine health data is indicated on the display by a caret.

12. The system of claim 11, wherein a color of the caret provides an indication of engine health.

13. The system of claim 11, wherein a position of the caret relative to an indicating bar provides an indication of engine health.

14. The system of claim 2, wherein the at least one target value is a limiting condition for the aircraft.

15. The system of claim 14, wherein the limiting condition is an exceedance value.

16. The system of claim 14, wherein the limiting condition is an engine turbine speed.

17. The system of claim 14, wherein the limiting condition is a rotor speed.

18. The system of claim 14, wherein the limiting condition is a turbine gas temperature.

19. The system of claim 14, further comprising:
displaying a warning on the display if the limiting condition is exceeded.

20. The system of claim 19, wherein the warning relates to an impending loss of rotor speed.

21. The system of claim 1, wherein the displayed engine power available data is the power available from more than one engine.

22. The system of claim 1, wherein the displayed engine power available data is the power available following a loss of one engine.

23. The system of claim 1, wherein the displayed engine power available data is recomputed at least once a minute to account for changing ambient conditions.

24. The system of claim 1, wherein the displayed engine power available data is recomputed at least once a second to account for changing ambient conditions.

25. The system of claim 1, further comprising:
a data storage module, coupled between the engine performance monitoring module and the display, that stores received data in a memory.

26. A method for generating and displaying engine performance data for an operating aircraft, comprising:

- (1) acquiring data from a sensor that monitors an engine performance related parameter;
- (2) comparing sensor data acquired in step (1) to engine diagnostic data;
- (3) computing engine power available data and engine health data based on a result of the comparison performed in step (2); and
- (4) displaying the engine power available data and the engine health data computed in step (3) on a display located in the aircraft.

27. The method of claim 22, further comprising:

- (5) calculating at least one target value based on the engine power available data computed in step (3).

28. The method of claim 27, wherein step (5) comprises computing an exceedance value.

29. The method of claim 27, wherein step (5) comprises computing a torque value.

30. The method of claim 27, wherein step (5) comprises computing a thrust value.

31. The method of claim 27, wherein step (5) comprises calculating a target value required for maximum range of the aircraft.

32. The method of claim 27, wherein step (5) comprises calculating a target value required for maximum endurance of the aircraft.

33. The method of claim 27, wherein step (5) comprises calculating a target value required for best rate of climb of the aircraft.

34. The method of claim 27, wherein step (5) comprises calculating a target value required to hover the aircraft in ground effect.

35. The method of claim 27, wherein step (5) comprises calculating a target value required to hover the aircraft out of ground effect.

36. The method of claim 27, wherein step (5) comprises calculating a limiting condition for the aircraft.

37. The method of claim 36, wherein step (5) comprises calculating a limiting turbine speed.

38. The method of claim 36, wherein step (5) comprises calculating a limiting turbine gas temperature.

39. The method of claim 36, wherein step (5) comprises calculating a limiting rotor speed.

40. The method of claim 36, further comprising:
(6) indicating, on the display, a warning if the limiting condition calculated in step (5) is exceeded.

41. The method of claim 40, wherein step (6) comprising:
indicating a warning of impending loss of rotor speed.

42. The method of claim 26, wherein step (4) comprises displaying the engine health data by a caret on the display.

- 43. The method of claim 40, further comprising:
 - (7) repeating steps (1) through (6) at least once a minute to account for changing ambient conditions.
- 44. The method of claim 40, further comprising:
 - (7) repeating steps (1) through (6) at least once a second to account for changing ambient conditions.
- 45. The method of claim 26, further comprising:
 - (5) storing engine power available data and engine health data computed in step (3) in a memory.